Claims

[1] An apparatus for passively cooling and retaining molten core material from a reactor, the apparatus comprising:
a molten core material retention tank installed inside a reactor cavity to retain molten core material from the reactor vessel;
a compressed gas tank having an outlet valve at an outlet thereof and supplying high-pressure inert gas;
a cooling water storage tank being installed higher than the molten core material retention tank, having an outlet valve at an outlet thereof, and supplying cooling water; and
a means for mixing inert gas supplied from the compressed gas tank with cooling water supplied from the cooling water storage tank and supplying the cooling water/inert gas mixture to the molten core material retention tank.

[2] The apparatus of claim 1, wherein the molten core material retention tank includes:
an outer retention vessel having at least one coolant hole formed in a side or bottom thereof and connected to the mixing means;
a porous protection vessel formed of refractory material at an inside of the outer retention vessel; and
a gravel layer formed between the outer retention vessel and the porous protection vessel, and filled with refractory gravels.

[3] The apparatus of claim 2, wherein the gravels are filled in the gravel layer to distribute and support the load of molten core material retained in the porous protection vessel.

[4] The apparatus of claim 1, wherein the mixing means includes pipes connected and extended respectively from the compressed gas tank and the cooling water storage tank.

[5] The apparatus of claim 2, wherein the porous protection vessel is made by sintering refractory gravel or powder.

[6] The apparatus of claim 2, wherein the outer retention vessel has a screen layer formed on an inner surface thereof.

[7] The apparatus of claim 1, wherein the cooling water storage tank has a check valve installed at the outlet thereof so as to prevent the backflow of high-pressure gas.

[8] The apparatus of claim 1, further comprising an intermediate storage tank, wherein steam generated by the reaction between the molten core material and the cooling water is condensed into water and the condensed water is resupplied

through the intermediate storage tank to the cooling water storage tank.

[9] The apparatus of claim 8, wherein the intermediate storage tank has a filter installed in an upper side thereof to filter the condensed water through the filter, whereby the filtered water is resupplied to the cooling water storage tank.